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NATIONAL DAM SAFETY PROGRAM. SEELEYS MILL DAM (NJ00065), ATLANT--ETC(U)
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ATLANTIC COAST BASIN
COHANSEY RIVER
CUMBERLAND COUNTY
NEW JERSEY

SEELEYS MILL DAM
NJ 00065

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

DEPARTMENT OF THE ARMY
Philadelphia District
Corps of Engineers
Philadelphia, Pennsylvania

April, 1979

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Seeleys Mill Dam, N.J.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.

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DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE—2D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO
NAPEN-D

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, New Jersey 08621

30 APR 1979

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Seeleys Mill Dam in Cumberland County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Seeleys Mill Dam, initially listed as a high hazard potential structure but reduced to a low hazard potential structure as a result of this inspection, is judged to be in good overall condition. However, the dam's spillway is considered inadequate since 34 percent of the 100 year Flood would overtop the dam. The low hazard potential classification means that in the event of failure of the dam, no loss of life and only minimal economic loss is expected. For the same reasons no further studies or increase of spillway capacity are recommended. To assure continued functioning of the dam and its impoundment, the following actions could be undertaken by the owner:

a. Remove trees from the upstream slopes to lessen the piping potential.

b. Rebuild the eroded upstream zones of the embankment crest with a berm of uniform width and level elevation so that the full spillway capacity can be utilized.

c. Repair the inoperable sluice gate.

d. Provide slope protection along the upstream slopes.

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this

NAPEN-D
Honorable Brendan T. Byrne

letter, a copy will also be sent to Congressman William J. Hughes of the Second District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Safety Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

1 Incl
As stated

Copies furnished:
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SEELEYS MILL DAM (NJ00065)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 22 December 1978 by Louis Berger and Associates, Inc. under contract to the State of New Jersey. The state, under agreement with the U. S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

Seeleys Mill Dam, initially listed as a high hazard potential structure but reduced to a low hazard potential structure as a result of this inspection, is judged to be in good overall condition. However, the dam's spillway is considered inadequate since 34 percent of the 100 year Flood would overtop the dam. The low hazard potential classification means that in the event of failure of the dam, no loss of life and only minimal economic loss is expected. For the same reasons no further studies or increase of spillway capacity are recommended. To assure continued functioning of the dam and its impoundment, the following actions could be undertaken by the owner:

a. Remove trees from the upstream slopes to lessen the piping potential.

b. Rebuild the eroded upstream zones of the embankment crest with a berm of uniform width and level elevation so that the full spillway capacity can be utilized.

c. Repair the inoperable sluice gate.

d. Provide slope protection along the upstream slopes.

APPROVED: James G. Ton

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

DATE: 30 Apr 79

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

Name of Dam Seeleys Mill Dam Fed ID# NJ 00065 and NJ ID# 497

State Located New Jersey
County Located Cumberland
Coordinates Lat. 3929.3 - Long. 7515.5
Stream Cohansey Creek
Dates of Inspection 22 December 1978,

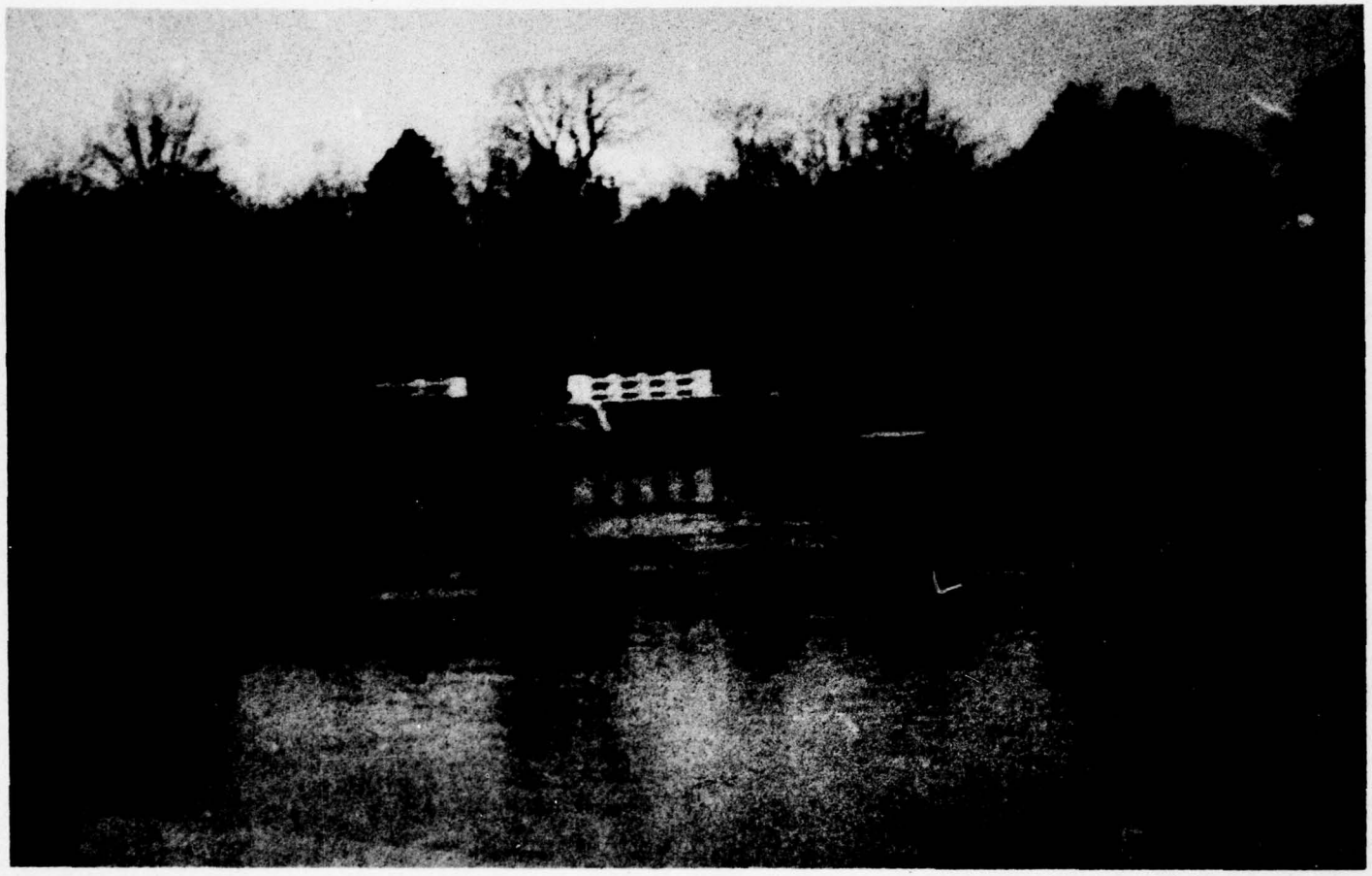
ASSESSMENT OF GENERAL CONDITIONS

Seeleys Mill Dam is assessed to be in an overall structurally good condition except for a portion of unprotected dam crest and is recommended to be downgraded from a high hazard to a low hazard category. Overtopping of the dam would not greatly increase the danger of loss of life or property damage as the downstream floodplain is uninhabited. No detrimental findings were revealed to warrant further engineering studies or to render a hazardous assessment. Recommended remedial actions to be undertaken in the future as part of a regular maintenance program include 1) repair the inoperable sluice gate 2) rebuild the unprotected dam crest east of the spillway and 3) remove trees and root systems along the upstream slopes and provide slope protection.

This dam has an inadequate spillway, being able to accommodate only 34% of the 100-year design flood.

F. Keith Jolls P.E.
Project Manager

STATE OF KENTUCKY
F. KEITH JOLLS
5432
REGISTERED PROFESSIONAL ENGINEER



OVERVIEW OF SEELEYS MILL DAM

JANUARY 1979

TABLE OF CONTENTS

FIGURES

APPENDIX

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
NAME OF DAM: SEELEYS MILL DAM FED ID# NJ 00065

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

This report is authorized by the Dam Inspection Act, Public Law 92-367, and has been prepared in accordance with Contract FPM-36 between Louis Berger & Associates, Inc. and the State of New Jersey and its Department of Environmental Protection, Division of Water Resources. The State, in turn, is under agreement with the U.S. Army Engineer District, Philadelphia, to have this inspection performed.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the structural and hydraulic condition of the Seeleys Mill Dam and appurtenant structures, and to determine if the dam constitutes a hazard to human life or property.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

Seeleys Mill Dam is a relatively new (20± years) earth highway embankment and spur dike approximately 800 feet in length with a concrete roadway bridge and spillway structure located about 300 feet from the westerly abutment. The highway embankment carries County Road 617 (a.k.a. Finley Road and Seeley - Columbia Corners Road) across the entire south shore of the man-made Seeleys Lake. The circular spillway abutting the upstream face of the bridge has a total crest length of 92 feet and discharges through the 40' clear opening of the single span County Bridge (No. UD-42)

immediately south below the spillway. A 4-foot diameter sluice gate is located at the left end of the spillway but is inoperable.

b. Location

Seeleys Mill Dam is located on County 617 Upper Deerfield Township, Cumberland County and is built across the Cohansey River, 2.5 miles east of the intersection of Cohansey Road and State Highway 49. It is about 3 miles north of the point where the Cohansey River empties into Sunset Lake in the City of Bridgeton.

c. Size Classification

The maximum structural height of the dam is 18 feet at the spillway and the maximum storage is estimated to be 492 acre-feet. Therefore the dam is placed in the small size category as defined by the Recommended Guidelines for Safety Inspection of Dams (storage less than 1,000 acre-ft.).

d. Hazard Classification

Based upon Corps of Engineers criteria and the fact that in the event of a failure, little damage would take place to downstream property or endanger human life, the classification of the dam is recommended to be downgraded to low hazard. Failure due to overtopping would most probably damage only the dam embankment and possibly the roadway intersection near the left abutment which lies several feet below the crest.

e. Ownership

According to Division of Water Resources records, the ownership of the dam (particularly the spillway) is questionable and has been the subject of legal adjudication in recent years. During the 1956 realignment of the road embankment and construction of the bridge, the owner of the lake, Seabrook Farms Inc. requested and was granted permission to

construct (at their expense) a spillway adjacent to and north of the bridge. The purpose was to recreate a lake for irrigation water supply for their farming operations. Correspondence between Seabrook and Cumberland County appears to indicate that Seabrook understood that after construction of the spillway, the County, through the 50 foot easment purchased, would assume the responsibility of operation and maintenance. The apparent misunderstanding never surfaced until a 1975 inspection of the dam by the Division of Water Resources which recommended an overhaul and mandatory repair of the inoperative sluice gate. The responsibility for effecting this repair then became moot after the Department of Water Resources ordered (on 26 December 1975) Seabrook Farms Inc., U.S. Trust Co. et al, "to open all operable gates and completely dewater Seeley Lake until such time as an inspection by this office together with a report from a N.J. licensed P.E. indicates that the structure is in safe operating condition." As the only gate remains inoperable, this apparently was never complied with. It is pointed out that the inspection contained herein, together with its findings, does not constitute any form of compliance with the above letter but only assesses the condition of the dam under the purview of PL 92-367. The ownership of the roadway which constitutes the entire embankment portion of the dam is apparently not questioned and remains with the Board of Chosen Freeholders of Cumberland County. However, according to sworn depositions taken from County officials, the spillway structure is outside the County right-of-way. As near as can be determined, the case is still in litigation.

f. Purpose of Dam

The dam was originally constructed to supply water power for Seeleys Mill which was located near the left abutment. In 1956, the dam was reconstructed slightly to the north on new alignment to provide irrigation water for farming.

g. Design and Construction History

The original dam at this location appears to have been in existence prior to the turn of the century and contained an old timber floodgate structure and iron bridge (erected in 1892). In 1934, the earth embankment failed near the left abutment in the vicinity of the old mill race. Since the mill was no longer in operation at that time, the raceway was filled in and the entire flow diverted through the existing bridge some 300 feet to the west. In January 1936 the dam again failed, heavily damaging the county road. No information is available regarding the reconstruction at this time and in September, 1940 the dam failed a third time. The embankment was entirely washed out at the site of the timber floodgate (which appears to have been immediately upstream from the present highway bridge). In the opinion, at that time, of an Assistant Division Engineer of Water Resources the existing iron bridge and portions of the highway to the east were too low and would be subject to submergence by backwater from flood flows. It appears the lake remained dewatered until 1955, when the County Engineer submitted plans for a new highway bridge and road realignment. Included in these plans were provisions for a timber core wall to extend from the new bridge site at least 10 feet into the existing original embankment and a cut-off wall to be built at the upper edge of the bridge invert/floor slab. However, there appears to have been no first instance intention of rebuilding a dam at this time. Shortly after contract award however, Seabrook Farms Inc. put forth their proposal for adding the circular spillway construction (which exists today).

h. Normal Operating Procedures

Available records indicate that the bridge and highway embankment are maintained by the Cumberland County Road Department. However, the maintenance of the gate and spillway structure is the subject of litigation. At the present time, there are no apparent operating procedures in effect and the dam functions as a free-flowing uncontrolled overflow structure.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of Seeleys Mill Dam is 23.0 square miles.

b. Discharge of Dam Site

The spillway capacity with the reservoir at the top of dam elevation (El. 53.5) is calculated to be 1,988 cfs. No discharge records are available at this site.

c. Elevation (Above M.S.L.)

Top of dam - +54.5 (West 358') and 53.5 (East 350')
Recreation Pool - +50.0
Streambed at center line of dam - +40.0 (paved invert)

d. Reservoir

Length of Recreation Pool - 5,400 feet
Length of Maximum Pool - 6,700 feet

e. Storage

Recreation Pool - 186 acre-ft.
Top of dam (El. 53.5) - 492 acre-ft.

f. Reservoir Surface

Top of dam - 106 acres
Recreation Pool - 69 acres

g. Dam

Type - Earth embankment with concrete spillway

Length - 800 feet (650 feet along road)

Structural height - 18 feet (concrete bridge structure)

Freeboard between normal reservoir and top of dam - 3.5 feet

Top Width - 45± feet

Side Slopes - 1½H:1V

Zoning - Composition and compactness unknown

h. Diversion and Regulating Tunnel

None

i. Spillway

Type - reinforced concrete circular weir
Length of weir - 92 feet
Crest Elevation - +50.0

j. Regulating Outlets

48" Ø vertical lift sluice gate (inoperable)
Invert El. + 40.8

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

Complete contract plans prepared in 1956 by Cumberland County were available for the spillway bridge which indicated all dimensions and major details of construction. Portions of the highway embankment plans were located but delineated only proposed elevations and limits of work and did not contain any details of embankment construction. No details were available as to the geometry or make-up of the spillway itself as this was done by the engineering department of Seabrook Farms Company as a change order to the highway work. It appears, however, that the spillway work was approved by the State Water Policy Commission under Dam Application No. 497 (34-5) but the plans could not be located.

2.2 CONSTRUCTION

The contract for construction of the road and bridge was awarded to Fiske Campbell Inc. of Bridgeton in 1956 but it is unknown whether or not this firm installed the sheet-piling and concrete spillway and gate structure. Judging from the relative condition, both were installed at the same time. There are apparently no as-built plans, construction records or boring records available. The underlying soils are recent alluvium overlying swampy deposits. The alluvial soils are mainly stratified silts and sands with some clay deposits of the Cape May formations which are typically narrow graded and many times in a loose, permeable condition.

2.3 OPERATION

Although there are no records available, the design appears to have operated satisfactorily from an engineering standpoint since its installation over 20 years ago.

2.4 EVALUATION

a. Availability

In view of the size and hazard classification, it is felt that sufficient engineering data

is available except for the unknown geotechnical make-up of the embankment.

b. Adequacy

The available plans are felt to be adequate engineering information upon which to base the Phase I assessment.

c. Validity

Based upon field observations, the validity of the design plans is not challenged.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspections were conducted on December 22, 1978 and January 10, 1979 at which both times there were several inches of flow over the spillway. Brief discussions were held with Mr. George Schock III, the Country Engineer who informed the inspection team of some of the history and particulars of the site.

b. Dam

The embankment portions of the dam along the roadway were found to be in moderately good condition although the frozen ground afforded little opportunity to observe and judge seepage areas. The 2-lane asphalt roadway over the 650 foot section along the dam axis is in excellent shape with only minor cracking and settlement. Some erosion was noted along the downstream slopes which are heavily covered with secondary growth.

The upstream side of the roadway shoulder to the left of the spillway has a narrow crest width of only 5-10 feet and is slightly above the roadway pavement. This crest zone, together with the 150-foot dike which extends back up along the east shore and forms the right abutment are in a loose, bulked condition. The crest is very narrow in numerous areas and would be highly susceptible to washouts if overtopped. Except for economic considerations, it is not clear why the 1956 road design continued the profile grade downward to the intersection of Finley Road and the Deerfield-Seeley Road which runs along the east shore of Seeleys Pond. This intersection is several feet below the dam crest and provides a potentially breeching zone, especially along the 150-foot spur which is poorly maintained and covered with heavy brush and several large trees. This places the narrow berm of fill along the north shoulder of the roadway and the re-entrant dike in a rather

tenuous position of maintaining a level dam crest when compared structurally to the excellent engineered stability of the remainder of the dam west of the bridge.

There is some evidence of minor erosion caused by the run-off from the roadway pavement and a small pond exists in the downstream area in the vicinity of the old raceway.

c. Appurtenant Structures

The highway bridge is in moderate to good condition. There is minor cracking and spalling of the concrete and the structural steel needs repainting but these conditions are of minor concern. The bridge is founded on piling and has negligible differential settlement or tilting.

The circular spillway is built on a 45-foot radius and has a concrete crest width of approximately 18 inches. Due to the uniform overflow during the inspections, the condition of the lower steel sheetpiling could not be observed. The concrete cap beam appears to be at a uniform grade and there was no evidence of broken zones or pieces missing. The juncture with the thrust block at the end of the arch and the wingwall is tight and shows no crushing or horizontal movement. The bridge has a 12-foot clear headroom between low steel and the 8-inch invert slab. Approximately 30 feet of steel sheet piling extend along the upstream face paralleling the dam axis each side of the north wingwalls. The 48-inch vertical lift slide gate is inoperable and from rough soundings taken near the entrance, its entrance is completely silted up.

d. Reservoir Area

Seeleys Mill Pond is an artificial reservoir and is clear of major debris. The banks on the south are quite high and heavily wooded and there are several homes along the north shore. Most are substantially above high water elevation. However, certain property

owners registered complaints in 1956 regarding the construction of the dam, contending that portions of their lands would be subject to flooding. Some error or misunderstanding existed in 1956 culminating in a request by Seabrook Farms to raise the spillway to El. 50 (from the original plan elevation of 47.8). This request was apparently approved.

e. Downstream Channel

The Cohansey River flows unimpeded after discharging from the study dam several thousand feet southward in a deep natural stream bed. About 50 feet downstream from the present bridge are the abutments of the 1892 iron truss bridge but these have little hydraulic effect on the downstream channel. The river flood plain is heavily wooded and there are no homes or development which would be effected by flooding should the dam collapse. The low water channel is well defined and has a clear width varying between 20 and 30 feet. There is a gaging station at the West Branch of the Cohansey River about 800 feet below the dam.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

Nothing was observed by the inspection team regarding operational procedures. The sluice gate has apparently been inoperative for many years and the dam has functioned completely as an uncontrolled overflow structure.

4.2 MAINTENANCE OF DAM

The roadway embankment and bridge are maintained by Cumberland County in a workmanlike fashion as part of their continual road program.

4.3 MAINTENANCE OF OPERATING FACILITIES

As stated elsewhere in this report, the maintenance of the sluice gate is a subject of misunderstanding and pending litigation. (See Section 1.2.e).

4.4 DESCRIPTION OF WARNING SYSTEM IN EFFECT

None exists except for monitoring by County and Municipal personnel during heavy storms.

4.5 EVALUATION

Although there are no operational procedures or safeguards, in view of the position of the dam the overall evaluation is deemed satisfactory; predicated however, on the remedial repairs set forth in Section 7 being properly undertaken.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data

The spillway is a circular concrete weir approximately 92 feet wide with a 48" sluice gate. The hydraulic drop to the concrete paved invert beneath the bridge is 10 feet and the 40-foot clear span bridge has a headroom of 12 feet which is more than adequate hydraulically to accommodate the normal spillway flows. Based upon the Recommended Guidelines for the Safety Inspection of Dams, the design flood is determined to be a 100-year frequency flood as the dam is in the small size category and in the downgraded low hazard classification. Inflow to the reservoir was calculated utilizing precipitation data from Technical Publication 40 and NOAA Tech. Memo NWS Hydro - 35 by the HEC-1 program which yielded a peak inflow of 5,847 cfs. Routing this storm through the reservoir reduced the discharge flow to 5,810 cfs. Therefore, the spillway capacity of 1,988 cfs can accommodate only 34% of the design flood. Hence, by Corps of Engineers criteria, the spillway is inadequate and the design flood would overtop the lower area of dam crest by 2.3 feet.

b. Experience Data

Although the dam has failed three times and been the subject of considerable problems regarding ownership and maintenance, no actual storm flows have been recorded. The 1956 Dam Application indicated a 50-year design flood of about 2,200 cfs (122% of Central New Jersey Curve) but there is no available field substantiation for this value. A 1976 report prepared by Dr. Terry W. Sturm of the University of Notre Dame indicated that a recent (July 1975) flood produced a discharge of 1625 cfs with roughly a 3-foot observed head flowing over the spillway. The decrease in channel width (to 40 feet) with an attendant reduction in

hydraulic capacity through the bridge opening comes into play only when a head of over 4 feet is being transmitted by the spillway.

c. Visual Observations

The spillway and the paved invert beneath the bridge appears to operate satisfactorily and show no evidence of damage from excess velocities. The downstream channel is not scoured out indicating the length of paved invert is sufficient for the energy attenuation.

d. Overtopping Potential

Reviewing the design discharge and spillway capacity, an overtopping potential exists. Due to the poor conditions of the dam crest in the area left of the bridge and the lower roadway elevation in this area, breaching would first occur at the southeast corner near the road intersection where the road is some 2.5 feet below the spillway crest. The discharge would flow directly across Finley Road and discharge into the area of the long-abandoned tailrace and then be redirected along the downstream toe westward along the abandoned roadway embankment.

e. Drawdown

At the present time drawdown is not immediately possible as the 48" sluice gate is inoperable. Upon opening this gate, it is estimated that it would take 1½ days to dewater the lake down to El. +40.8 which is roughly at the bottom of the pond.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Based upon the visual inspection, all elements of the Seeleys Pond Dam are believed to be in sound structural condition except for the narrow, ill-defined earth crest that forms the effective top of dam in the area that extends from approximately 150 feet to the left of the spillway bridge over to the southeast corner of the pond and northward 150 feet to the vicinity of the left abutment. This berm is very irregularly shaped and poorly compacted. The remainder of the roadway embankment is quite wide in relation to its height and is of sound stable construction. The bridge and spillway structure are also in sound structural condition and show only minor evidence of deterioration. However, the inspection team expressed major concern over the embankment crest zone which is not protected by roadway pavement.

b. Design and Construction Data

The review of the available plans indicate that the bridge structure was conservatively designed using AASHO loadings and allowable stresses that were in effect in 1957. It was noted that the north wingwalls were specially designed to accommodate the thrust of the arched spillway (although the piling is battered in the wrong direction). Nothing is known regarding the geometry, construction or materials of the spillway except that its underlying support is formed of interlocking steel sheet piling. From the relatively low height, the bending stresses are thought to be of minor importance even if minimum weight sections were employed.

c. Operating Records

No records are available but the dam appears to operate satisfactory as an uncontrolled spillway structure. There are no known instances of overtopping since its reconstruction.

d. Post Construction Changes

There is no evidence of any major post construction changes since the 1956 rebuilding. It appeared that additional fill material had been recently deposited in the unprotected areas of the dam crest (commented upon above) but this is conjectural due to frozen ground conditions at the time of inspection. There is a record of correspondence in 1957 between the State and Seabrook Farms requesting that the spillway crest be modified but this could not be confirmed. This request appears to have been granted from the interrelationship of spillway to wingwall elevations.

e. Seismic Stability

Seeleys Pond Dam is located in Zone 1 and due to embankment width vs low height has negligible potential earthquake vulnerability. Experience indicates dams with adequate stability under static loads will have adequate stability under dynamic loadings.

SECTION 7 - ASSESSMENTS/RECOMMENDATIONS/ PROPOSED REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

Subject to the inherent limitations of the Phase I visual inspection, Seeleys Pond Dam is classified as being in a good overall structural condition although the spillway is incapable of passing the design flood. The dam embankment is built of unknown composition but due to its large width to height ratio and lack of any evidence of seepage, is believed to be of a sufficient impermeable condition to withstand normal hydraulic heads and maintain its long-term stability. However, serious reservations are expressed about the condition of the embankment crest berm east of the spillway and extending northward along the reservoir. This zone is in a dangerous uncompacted condition and could be easily breached should the dam be overtopped. The spillway capacity is inadequate and does not meet the requirements of the Recommended Guidelines for Safety Inspection of Dams, being able to accommodate only 34% of the design flood as calculated by Corps of Engineers criteria. The SDF is calculated to overtop the dam by 2.3 feet at the low points near the left abutment and except for possible damage to the roadway shoulders and downstream slopes, it is believed that little other major damage would occur. There are no economical or feasible way to increase the capacity of the spillway as presently constructed.

b. Adequacy of Information

The information gathered for the Phase I inspection is deemed to be adequate regarding the structural stability analysis of the dam. No recent surveys have been made.

c. Urgency

No urgency is attached to implementing any remedial work and it is recommended that the measures enumerated below be taken under advisement in the future as part of the County's regular maintenance program.

d. Necessity for Further Study

Due to the low hazard classification of the Seeleys Pond Dam and because only minor property damage and danger to loss of life is foreseen in the event of a failure, further engineering studies are believed to be unnecessary.

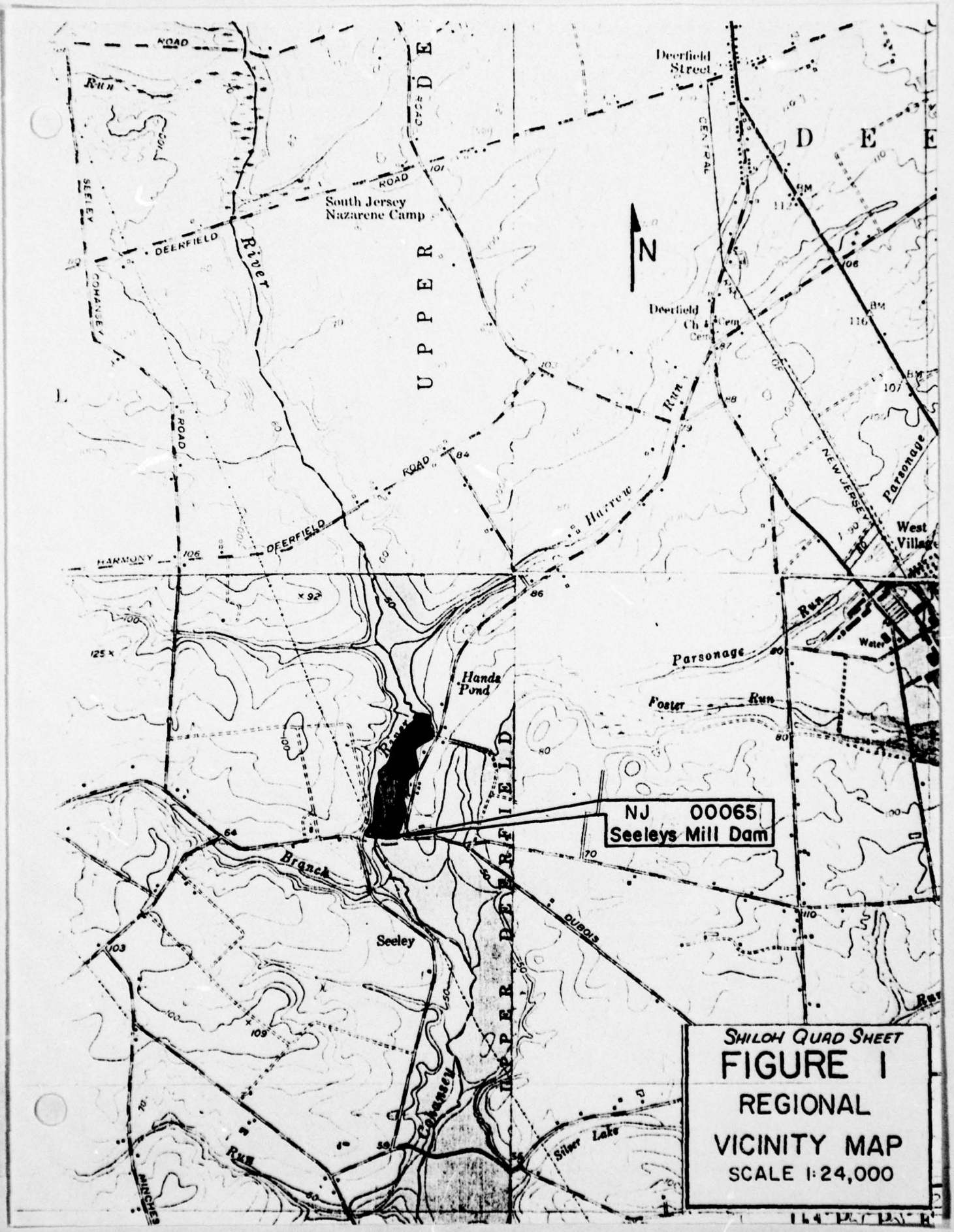
7.2 RECOMMENDATIONS/REMEDIAL MEASURES

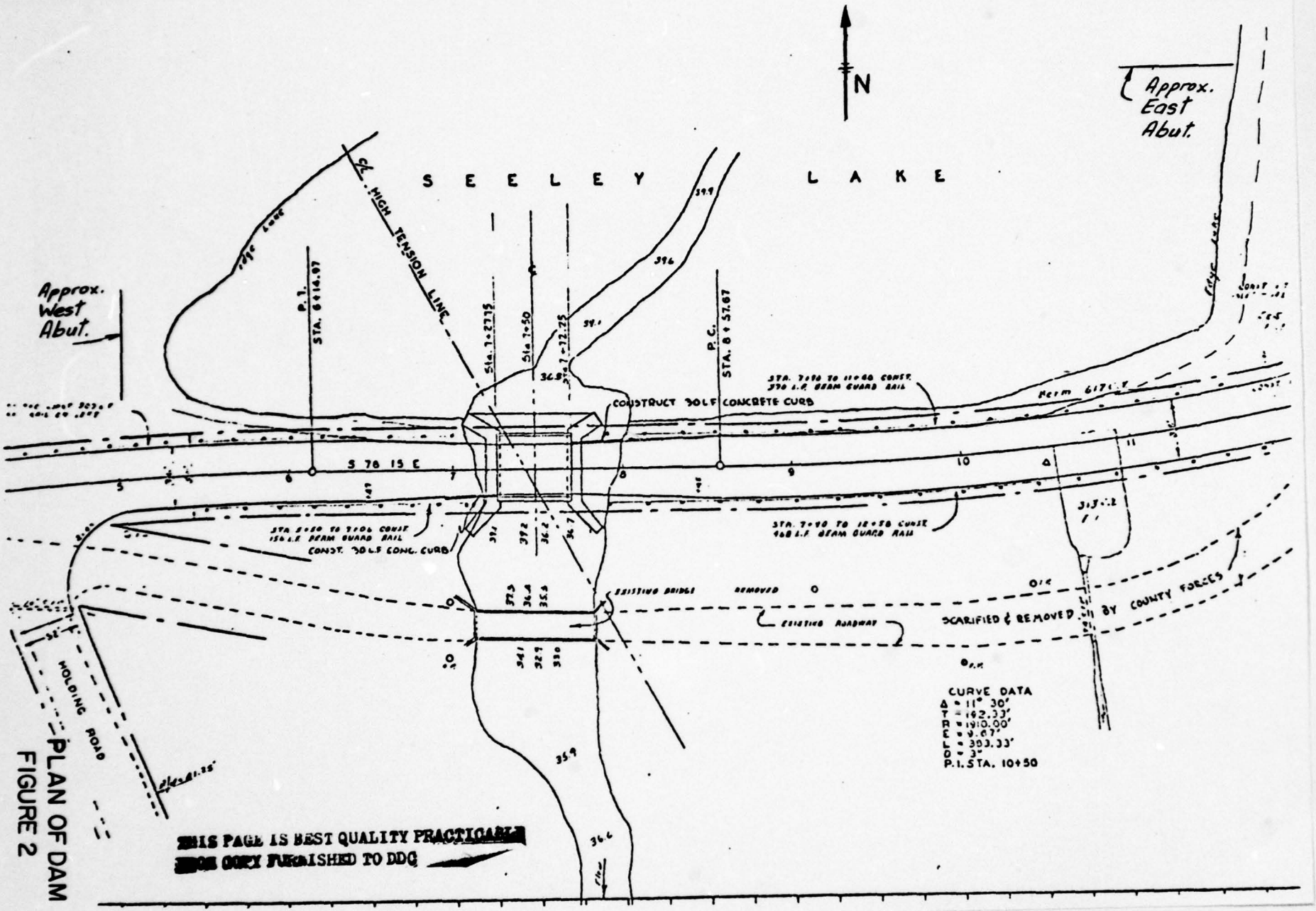
a. Recommended Measures

- The upstream zones of the embankment crest should be rebuilt with a berm of uniform width and level elevation so that the full spillway capacity can be utilized.
- The trees and root systems should be removed from the upstream slopes and the slopes protected.
- The 48" sluice gate should be repaired and its entrance unplugged.

b. O&M Maintenance and Procedures

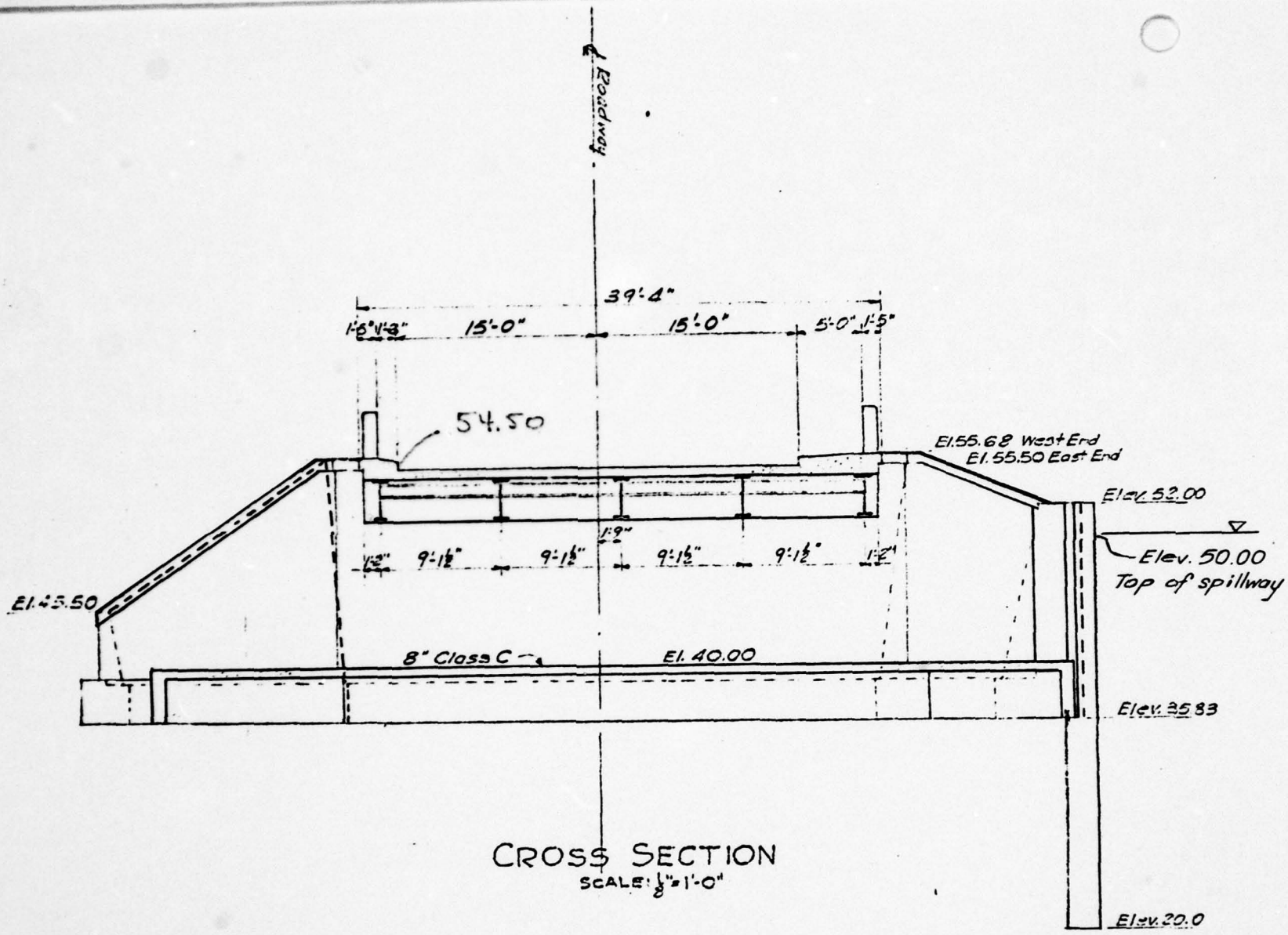
The present County procedures are deemed adequate in view of the hazard classification and the above assessment. However, as explained in paragraph 1.2.e. the ownership and responsibility of maintenance should be clarified so that in case of a collapse or personal accident, the legal ambiquities (and ensuing criminations and recriminations) do not present a derisive reflection on the enforcement of the State of New Jersey's enforcement of Title 58 Supervision Over Dams and Reservoirs.


NJ 00065
Seeleys Mill Dam
SHILOH QUAD SHEET
FIGURE 1
REGIONAL
VICINITY MAP
SCALE 1:24,000
South Jersey
Nazarene Camp
Deerfield
Street
Deerfield
Ch & Cem
Hands
Pond
Seeley
Silver Lake
West
Village
Parsonage
Foster Run
Harrow Run
DEERFIELD ROAD
UPPER DEERFIELD
Cohansey
DUBOIS
NEW JERSEY
CENTRAL
SEELEY
COHANSEY
MINCHER
N



PLAN OF DAM

FIGURE 2



CROSS SECTION
SCALE: ⅛"=1'-0"

BRIDGE SECTION

FIGURE 3

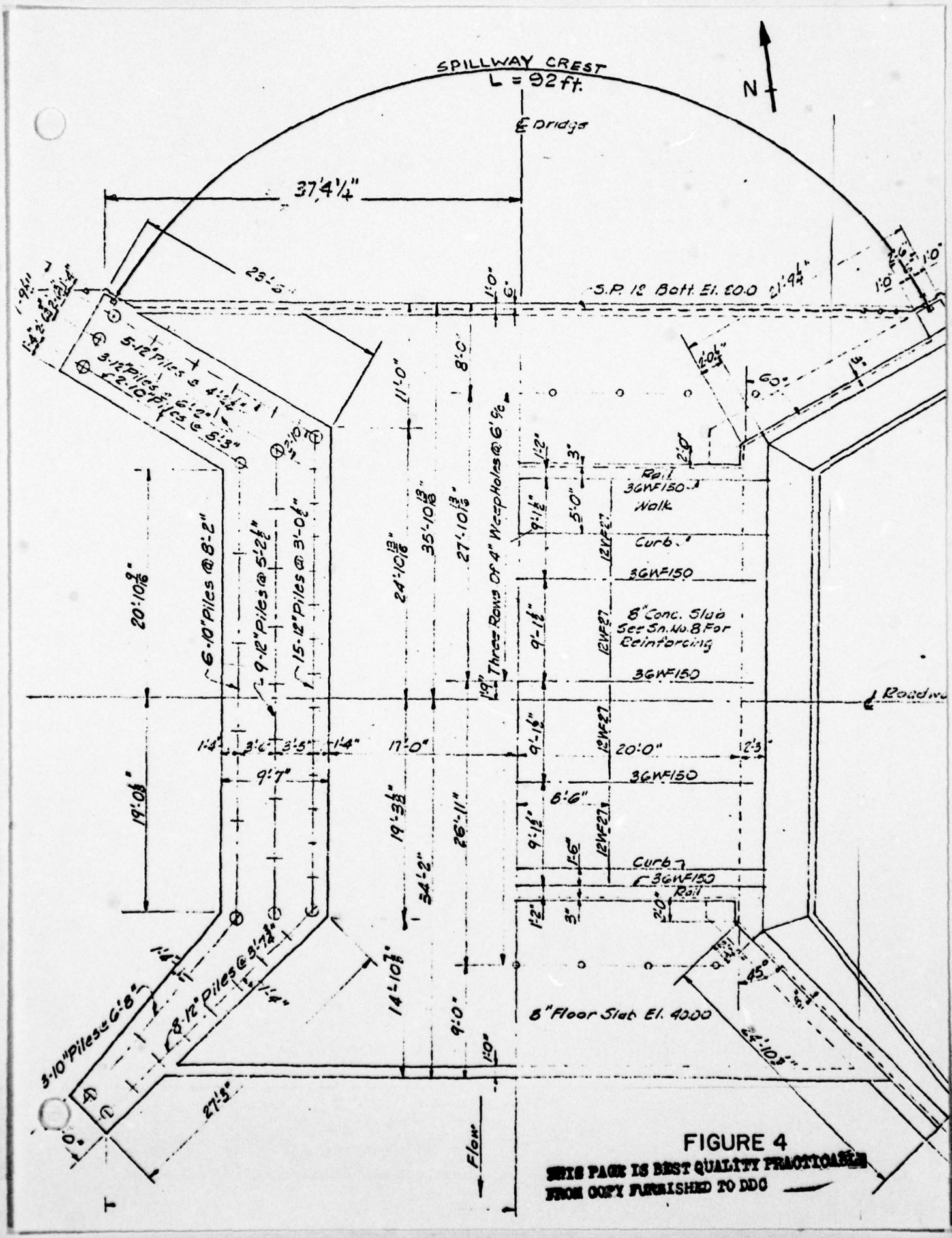


FIGURE 4

Check List
Visual Inspection
Phase 1

Name Dam Seeley Dam County Cumberland State New Jersey Coordinators NJDEP

Date(s) Inspection Dec.22,1978 Jan.10,1979 Weather Cloudy, Cold Temperature 22°

Pool Elevation at Time of Inspection + 50.3 M.S.L. Tailwater at Time of Inspection + 41.6 M.S.L.

Inspection Personnel:

K. Jolls

R. Lang

E. Simone

R. Lang Recorder

Dam No. 00065

EARTH DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Satisfactory - asphalt roadway on embankment.	
DRAINS	Several cuts in shoulders handle roadway drainage.	Weepholes at base of downstream wingwalls leaking some water (about 1' above low water).
WATER PASSAGES	None	
FOUNDATION	Bridge structure on piles.	Steel sheet piling at ends of abutments at corner of spillway.

EARTH DAMS

VISUAL EXAMINATION OF	OBERSVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Minor	
STRUCTURAL CRACKING	No major cracking observed.	
VERTICAL AND HORIZONTAL ALIGNMENT	Satisfactory	
MONOLITH JOINTS	N/A	
CONSTRUCTION JOINTS	Satisfactory condition.	Bridge railing in excellent condition.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	Poor condition in numerous areas.	Very soft embankment at left abutment (appears recently placed).
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None observed.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Yes, bad area at corner of Lake Drive and Finley Road.	Slopes 1/2:1 but quite irregular.
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	Narrow crest in many areas (6' $\pm$) poorly shaped, loose fill material.	
RIPRAP FAILURES	N/A	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Satisfactory	
ANY NOTICEABLE SEEPAGE	None observed (ground frozen)	
STAFF GAGE AND RECORDER	None	
DRAINS	N/A	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	None observed.	Excellent condition.
INTAKE STRUCTURE	Circular spillway, good condition.	48" ø gate at left end (inoperative).
OUTLET STRUCTURE	County Bridge - 40' clear span.	Cantilever abutments. Flared wingwalls.
OUTLET CHANNEL	Natural channel.	
EMERGENCY GATE	Inoperative sluicegate at spillway.	Inv. about 7' below crest.

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Curved spillway built onto North side of bridge.	
APPROACH CHANNEL	None - Lake directly above dam and spillway.	
DISCHARGE CHANNEL	Natural river channel, mostly clear some debris about 40-50' wide.	
BRIDGE AND PIERS	County Bridge UD-42 built 1958.	40' clear span. Steel 36 WF 150 beams.

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	N/A	
APPROACH CHANNEL	N/A	
DISCHARGE CHANNEL	N/A	
BRIDGE AND PIERS	N/A	
GATES AND OPERATION EQUIPMENT	N/A	

INSTRUMENTATION

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	None	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Clear of debris, high wooded banks on west side.	Several homes on East side, well above flood elevation.
SEDIMENTATION	Unknown, lake surface frozen.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Considerable debris.	Old bridge abutments and road approximately 40-50' below new bridge. Much lower elevation.
SLOPES	Steep slopes, heavily wooded.	
APPROXIMATE NO. OF HOMES AND POPULATION	None observed.	

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM	REMARKS
PLAN OF DAM	Available (all available material from NJDEP records)
REGIONAL VICINITY MAP	Available (Quad sheet)
CONSTRUCTION HISTORY	Available
TYPICAL SECTIONS OF DAM	Available
HYDROLOGIC/HYDRAULIC DATA	Some available
OUTLETS - PLAN	Available
- DETAILS	Available
-CONSTRAINTS	Available
-DISCHARGE RATINGS	Available
RAINFALL/RESERVOIR RECORDS	None available

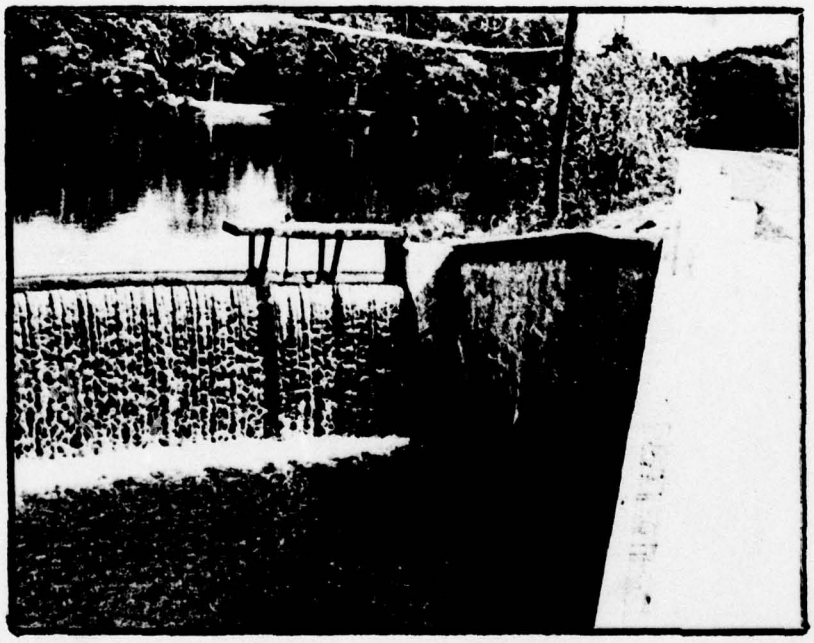
ITEM	REMARKS
DESIGN REPORTS	None available
GEOLOGY REPORTS	None available
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None available
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None available
POST-CONSTRUCTION SURVEYS OF DAM	Unknown
BORROW SOURCES	Unknown

ITEM	REMARKS
MONITORING SYSTEMS	N/A
MODIFICATIONS	N/A
HIGH POOL RECORDS	Not available
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Available
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	Known Some available
MAINTENANCE OPERATION RECORDS	None available

ITEM	REMARKS
SPILLWAY PLAN	Available
SECTIONS	
DETAILS	
OPERATING EQUIPMENT PLANS & DETAILS	

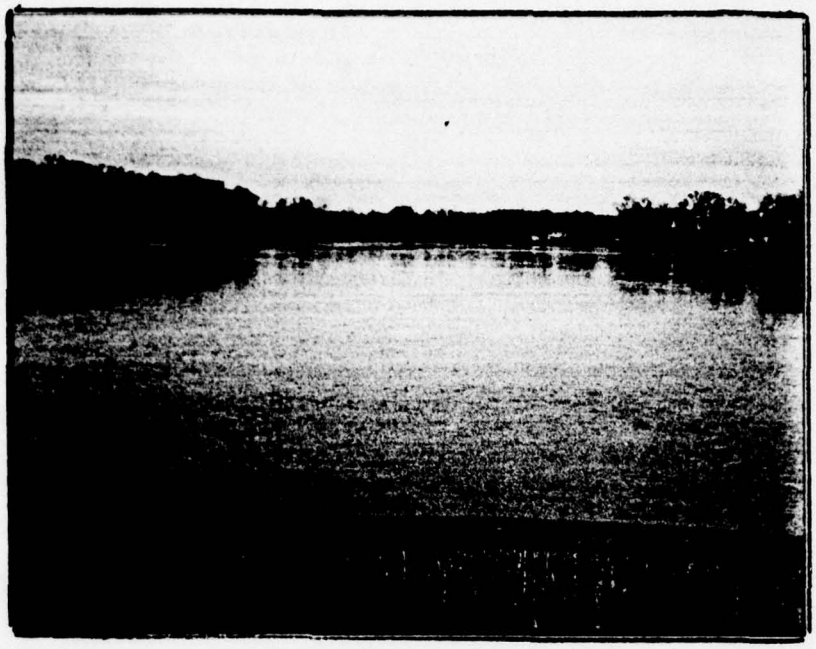
View East along dam crest (Cty. Rte. 617)

September 1978



48"ø sluicegate at left end of spillway

September 1978



Seeleys Mill Lake

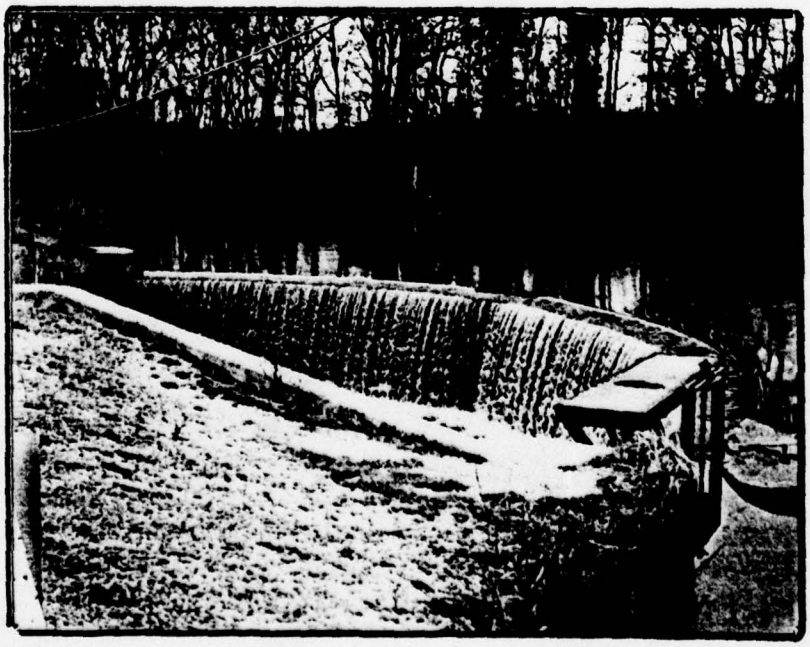
January 1979

Downstream channel

September 1978

County bridge just below spillway

January 1979



Spillway

January 1979

Dam No. 00065

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Drainage Area = 23.0 square miles

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): + 50 M.S.L. (186 acre-feet)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): + 53.5 M.S.L. (492 acre-feet)

ELEVATION MAXIMUM DESIGN POOL: Unknown

ELEVATION TOP DAM: + 54.5 M.S.L. (west end); +53.5 (east end)

CREST: two-lane roadway

a. Elevation + 50.0 M.S.L.
b. Type Circular sharp crested weirs
c. Width Unknown (1'±)
d. Length 92'±
e. Location Spillover
f. Number and Type of Gates None

OUTLET WORKS: 1-48" ø Sluicegate

a. Type Vertical lift slide gate
b. Location Left spillway abutment
c. Entrance inverts + 40.8
d. Exit inverts
e. Emergency draindown facilities

HYDROMETEOROLOGICAL GAGES: None

a. Type
b. Location
c. Records

MAXIMUM NON-DAMAGING DISCHARGE: 1988 cfs

BY D.L. DATE Jan. '79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. A1 OF
CHKD. BY DATE SEELEY'S MILL DAM INSPECTION PROJECT C-226
SUBJECT

SNYDER COEFFICIENTS (FROM CORPS OF ENGINEERS)

$C_t = 4.51$
$C_p = 0.70$

LENGTH OF LONGEST WATERCOURSE = 5.03 mi.
LENGTH TO CENTROID = 1.80 mi.

$$t_p = C_t (L \times L_c)^{0.3}$$

$$= 4.51 (5.03 \times 1.80)^{0.3}$$

$$= 8.74 \text{ hours}$$

BY. D.J.M. DATE 4-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. A2 OF...

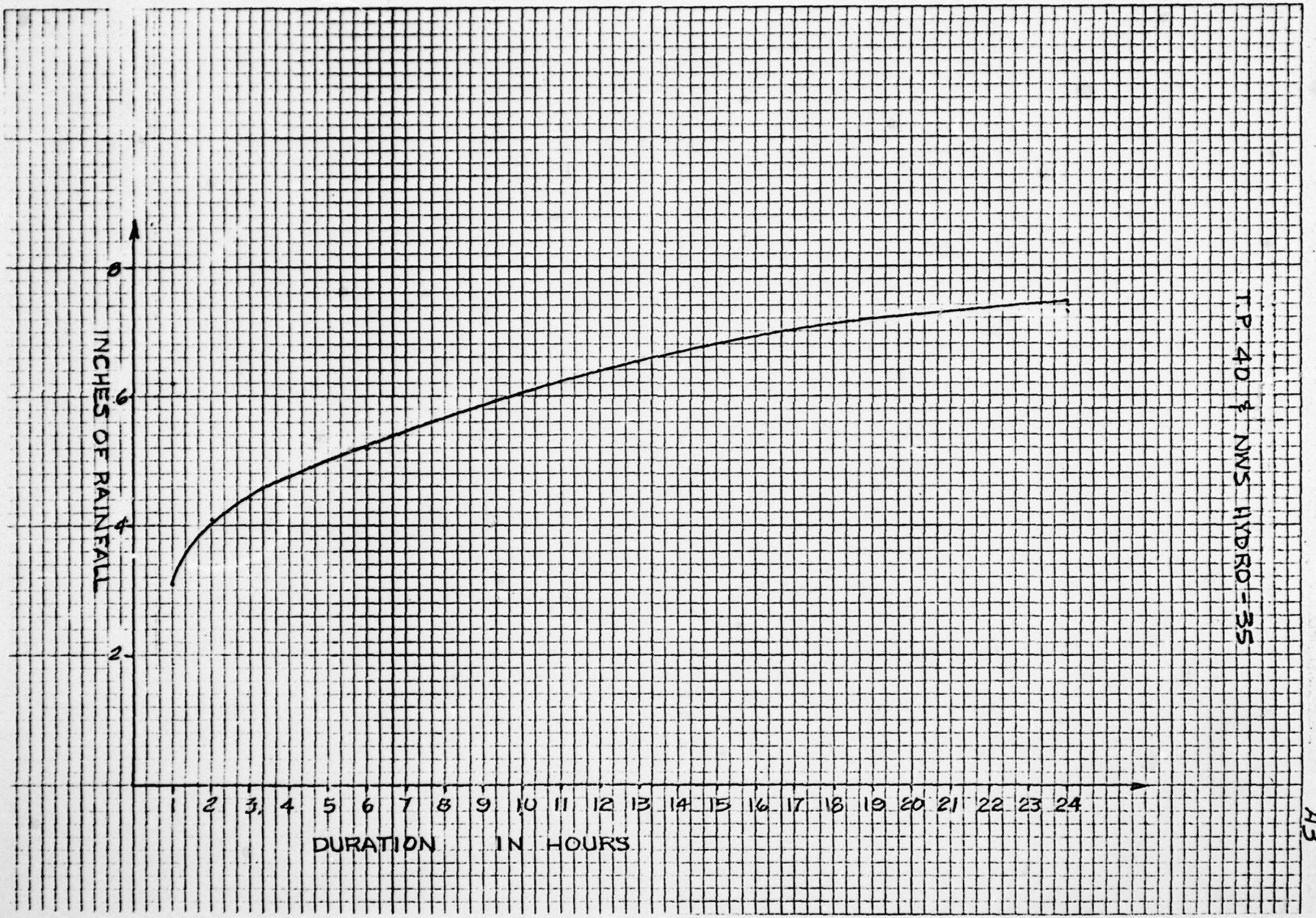
CHKD. BY..... DATE..... SEELEYS MILL DAM INSPECTION PROJECT C-226

SUBJECT.....

Precipitation data from TP-40 and NOAA Technical Memorandum NWS-HYDRO 35

Time	Precipitation	Δ	Rearrange
1	3.10	3.10	0.20
2	4.00	1.10	0.20
3	4.40	0.40	0.20
4	4.71	0.31	0.31
5	4.96	0.25	1.10
6	5.20	0.20	3.10
7	5.40	0.20	0.40
8	5.60	0.20	0.25
9	5.80	0.20	0.20
10	6.00	0.20	0.20
11	6.20	0.20	0.20
12	6.40	0.20	0.20

46 0706



A3

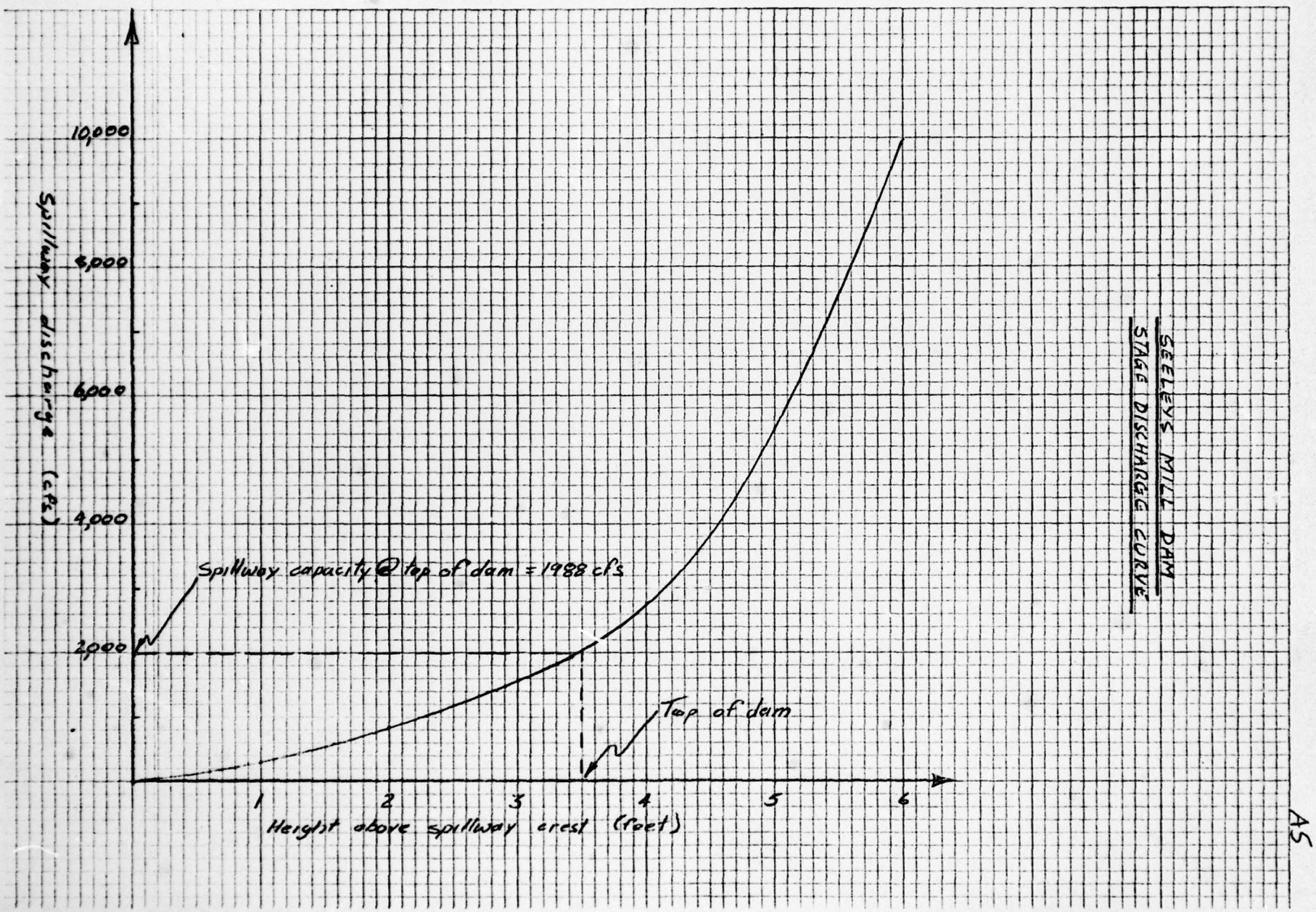
BY D J M DATE 4-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. A4 OF...
CHKD. BY...DATE... SEELEY MILL DAM INSPECTION PROJECT 6226
SUBJECT...

Elevation of spillway crest = +50.0

Over Spillway L = 92'			Over crest (El. 53.5) L = 350'			Over Crest (El. 54.5) L = 358'			ΣQ	
H	C	Q	H	C	Q	H	C	Q	height above spillway crest	Q (cfs)
1	3.3	304							1	304
2	3.3	859							2	859
3	3.3	1578							3	1578
3.5	3.3	1988	0	2.7	0				3.5*	1988
4	3.3	2429	0.5	2.7	334				4	2763
4.5	3.3	2898	1.0	2.7	945	0	2.7	0	4.5	3843
5	3.3	3394	1.5	2.7	1736	0.5	2.7	342	5	5472
6	3.3	4462	2.5	2.7	3735	1.5	2.7	1776	6	9973
7	3.3	5623	3.5	2.7	6188	2.5	2.7	3821	7	15632
8	3.3	6870	4.5	2.7	9021	3.5	2.7	6329	8	22220

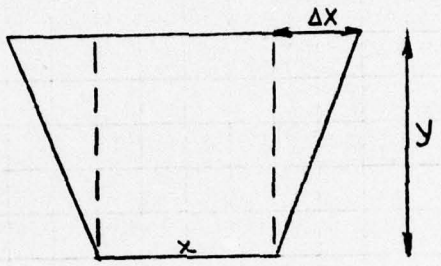
Discharge through 48" sluice neglected

* indicates top of dam @ El. 53.5 discharge = 1988 cfs



BY DL DATE Jan '79 | **LOUIS BERGER & ASSOCIATES INC.** | SHEET NO. A6 OF
CHKD. BY DATE | SEELEY'S MILL DAM INSPECTION | PROJECT C-226
SUBJECT SURCHARGE STORAGE

AREA OF CONTOUR @ El. 50 = 68.6 acres
AREA OF CONTOUR @ El. 60 = 174.3 acres

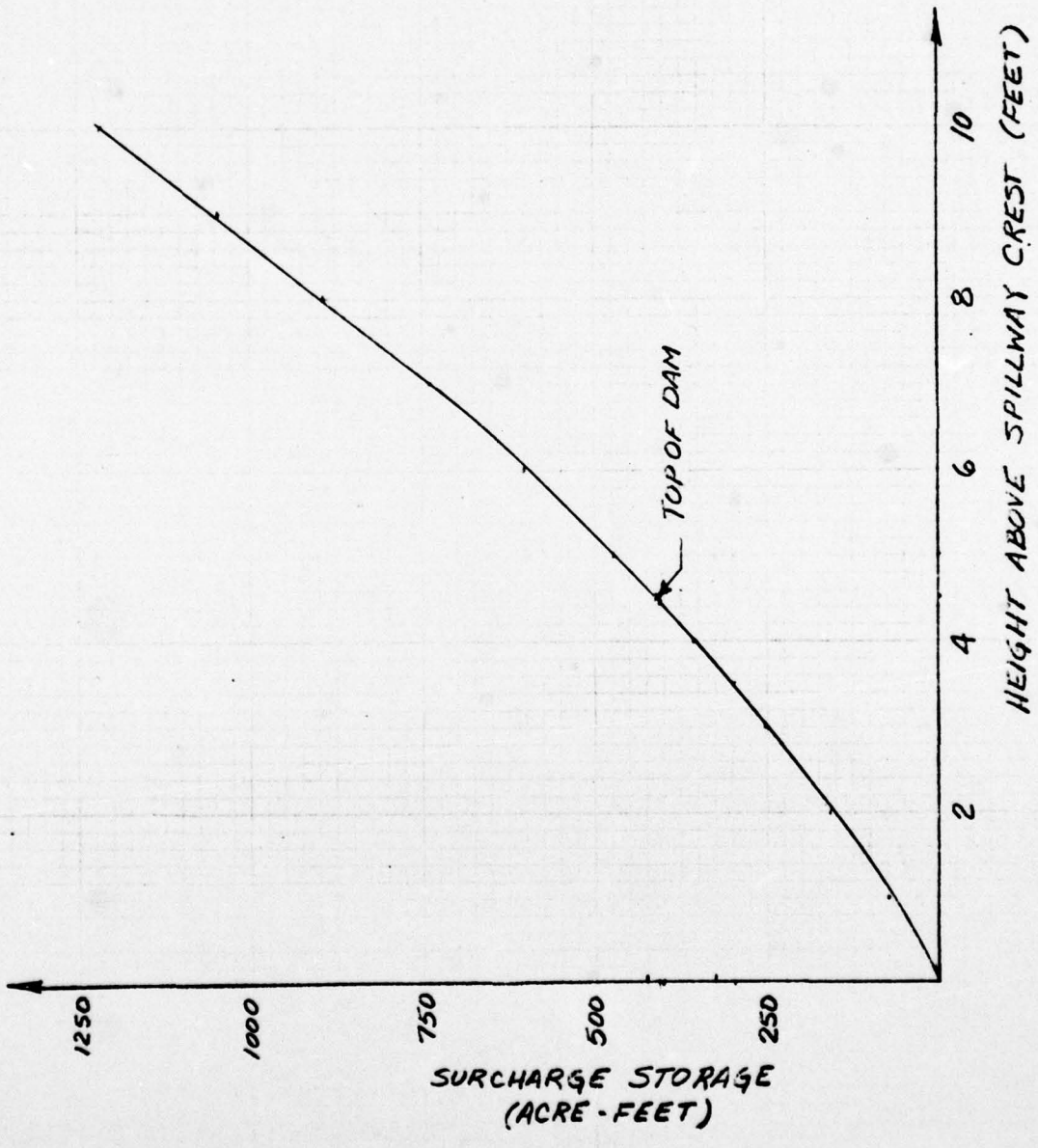


INCREMENT IN VOLUME $\Delta V = (x + \Delta x)y$

HEIGHT ABOVE CREST (FT.)	STORAGE (ACRE-FT.)
1	74
2	158
3	253
4	359
5	475
6	602
7	739
8	887
9	1045
10	1215

BY D.L. DATE JAN '79 SUBJECT STAGE STORAGE CURVE SHEET NO. A7 OF

CHKD. BY DATE SEELEYS MILL DAM INSPECTION JOB NO. C-226



BY D.J.M DATE 4-79
CHKD. BY _____ DATE _____
SUBJECT _____

LOUIS BERGER & ASSOCIATES INC.
SEELEYS MILL DAM INSPECTION

SHEET NO. A8A OF ...
PROJECT C226

Drawdown of lake from El. 50. to El. 40.80
Through 48" Sluicegate

Assume inflow of 46 cfs (≈ 2 cfs/sq mile)

Volume of lake = 61×10^6 gallons = 8.13×10^6 ft^3

drawdown under 2 heads : ½ volume under head of 6.9'
& ½ volume under head of 2.3'

i) $h = 6.9'$

$$Q = 0.6 \times 12.6 \sqrt{64.32 \times 6.9} - 46 = 113 \text{ cfs}$$

$$\text{time} = \frac{8.13 \times 10^6}{2 \times 113 \times 3600} = 10 \text{ hours}$$

ii) $h = 2.3'$

$$Q = 0.6 \times 12.6 \sqrt{64.32 \times 2.3} - 46 = 46 \text{ cfs}$$

$$\text{time} = \frac{8.13 \times 10^6}{2 \times 46 \times 3600} = 24.6 \text{ hours}$$

$$\Sigma \text{ time} = 10 + 24.6 = 34.6 \text{ hours}$$

Say 1 ½ days

BY R.G.L. DATE 4-79 LOUIS BERGER & ASSOCIATES INC.

CHKD. BY DATE Seeleys Mill Dam Insp. SHEET NO. 40 OF

SUBJECT HEC-1 PROJECT C226

SEELEYS MILL DAM INSPECTION SOUTH GROUP C226
BY R G LANG
JANUARY 1979

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
150	1	0	0	0	0	0	0	0	0

JOPER	NWT
3	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
3	0	0	0	0	0	1

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	1	23.00	0.0	23.00	0.0	0.0	0	0	0

PRECIP DATA

NP	STORM	DAJ	DAK
12	0.0	0.0	0.0

PRECIP PATTERN

0.20	0.20	0.20	0.31	1.10	3.10	0.40	0.25	0.20	0.20
0.20	0.20								

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	0.50	0.10	0.0	0.0

UNIT HYDROGRAPH DATA

TP= 8.70 CP=0.70 NTA= 0

RECESSION DATA

STRTQ= 0.0 QRCSN= 0.0 RTIOR= 1.00

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC=10.16 AND R= 6.43 INTERVALS

UNIT HYDROGRAPH 40 END-OF-PERIOD ORDINATES, LAG= 8.73 HOURS, CP= 0.70 VOL= 1.00

47.	172.	344.	536.	738.	932.	1083.	1175.	1209.	1180.
1068.	917.	784.	671.	574.	491.	421.	360.	308.	263.
225.	193.	165.	141.	121.	103.	89.	76.	65.	55.
47.	41.	35.	30.	25.	22.	19.	16.	14.	12.

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.20	0.00	0.
2	0.20	0.00	0.
3	0.20	0.05	2.
4	0.31	0.21	18.
5	1.10	1.00	100.

6	3.10	3.00	412.
7	0.40	0.30	1024.
8	0.25	0.15	1827.
9	0.20	0.10	2729.
10	0.20	0.10	3667.
11	0.20	0.10	4543.
12	0.20	0.10	5235.
13	0.0	0.0	5677.
14	0.0	0.0	5847.
15	0.0	0.0	5707.
16	0.0	0.0	5247.
17	0.0	0.0	4641.
18	0.0	0.0	4069.
19	0.0	0.0	3548.
20	0.0	0.0	3077.
21	0.0	0.0	2654.
22	0.0	0.0	2277.
23	0.0	0.0	1949.
24	0.0	0.0	1667.
25	0.0	0.0	1427.
26	0.0	0.0	1221.
27	0.0	0.0	1045.
28	0.0	0.0	894.
29	0.0	0.0	765.
30	0.0	0.0	655.
31	0.0	0.0	560.
32	0.0	0.0	479.
33	0.0	0.0	410.
34	0.0	0.0	351.
35	0.0	0.0	300.
36	0.0	0.0	257.
37	0.0	0.0	220.
38	0.0	0.0	188.
39	0.0	0.0	161.
40	0.0	0.0	138.
41	0.0	0.0	118.
42	0.0	0.0	101.
43	0.0	0.0	86.
44	0.0	0.0	71.
45	0.0	0.0	51.
46	0.0	0.0	14.
47	0.0	0.0	9.
48	0.0	0.0	6.
49	0.0	0.0	4.
50	0.0	0.0	3.
51	0.0	0.0	1.
52	0.0	0.0	0.
53	0.0	0.0	0.
54	0.0	0.0	0.
55	0.0	0.0	0.
56	0.0	0.0	0.
57	0.0	0.0	0.
58	0.0	0.0	0.
59	0.0	0.0	0.
60	0.0	0.0	0.
61	0.0	0.0	0.
62	0.0	0.0	0.
63	0.0	0.0	0.
64	0.0	0.0	0.
65	0.0	0.0	0.
66	0.0	0.0	0.
67	0.0	0.0	0.
68	0.0	0.0	0.
69	0.0	0.0	0.
70	0.0	0.0	0.
71	0.0	0.0	0.
72	0.0	0.0	0.
73	0.0	0.0	0.
74	0.0	0.0	0.
75	0.0	0.0	0.
76	0.0	0.0	0.
77	0.0	0.0	0.
78	0.0	0.0	0.
79	0.0	0.0	0.
80	0.0	0.0	0.
81	0.0	0.0	0.
82	0.0	0.0	0.
83	0.0	0.0	0.
84	0.0	0.0	0.
85	0.0	0.0	0.
86	0.0	0.0	0.
87	0.0	0.0	0.
88	0.0	0.0	0.
89	0.0	0.0	0.
90	0.0	0.0	0.
91	0.0	0.0	0.
92	0.0	0.0	0.
93	0.0	0.0	0.
94	0.0	0.0	0.
95	0.0	0.0	0.
96	0.0	0.0	0.
97	0.0	0.0	0.
98	0.0	0.0	0.
99	0.0	0.0	0.
100	0.0	0.0	0.
101	0.0	0.0	0.
102	0.0	0.0	0.
103	0.0	0.0	0.
104	0.0	0.0	0.
105	0.0	0.0	0.
106	0.0	0.0	0.
107	0.0	0.0	0.
108	0.0	0.0	0.
109	0.0	0.0	0.
110	0.0	0.0	0.
111	0.0	0.0	0.
112	0.0	0.0	0.
113	0.0	0.0	0.
114	0.0	0.0	0.
115	0.0	0.0	0.
116	0.0	0.0	0.
117	0.0	0.0	0.
118	0.0	0.0	0.
119	0.0	0.0	0.
120	0.0	0.0	0.
121	0.0	0.0	0.
122	0.0	0.0	0.
123	0.0	0.0	0.
124	0.0	0.0	0.
125	0.0	0.0	0.
126	0.0	0.0	0.
127	0.0	0.0	0.

128	0.0	0.0	0.
129	0.0	0.0	0.
130	0.0	0.0	0.
131	0.0	0.0	0.
132	0.0	0.0	0.
133	0.0	0.0	0.
134	0.0	0.0	0.
135	0.0	0.0	0.
136	0.0	0.0	0.
137	0.0	0.0	0.
138	0.0	0.0	0.
139	0.0	0.0	0.
140	0.0	0.0	0.
141	0.0	0.0	0.
142	0.0	0.0	0.
143	0.0	0.0	0.
144	0.0	0.0	0.
145	0.0	0.0	0.
146	0.0	0.0	0.
147	0.0	0.0	0.
148	0.0	0.0	0.
149	0.0	0.0	0.
150	0.0	0.0	0.
SUM	6.56	5.11	75452.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5847.	5392.	2975.	1048.	75452.
INCHES		2.18	4.81	5.09	5.09
AC-FT		2675.	5903.	6239.	6239.

HYDROGRAPH ROUTING

ROUTING THROUGH RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
33	1	0	0	0	0	1

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	0.

STORAGE=	0.	74.	158.	253.	306.	359.	417.	475.	602.	739.
OUTFLOW=	0.	304.	859.	1578.	1988.	2763.	3843.	5472.	9973.	15632.

TIME	EOP STOR	AVG IN	EOP OUT
1	0.	0.	0.
2	0.	0.	0.
3	0.	1.	0.
4	1.	10.	3.
5	5.	59.	20.
6	21.	256.	88.
7	66.	718.	271.
8	142.	1426.	750.
9	238.	2278.	1466.
10	340.	3198.	2479.

BY RGL DATE 4-79 | LOUIS BERGER & ASSOCIATES INC. | SHEET NO. A11 OF ...

CHKD. BY ..... DATE ..... | SEELY'S MILL DAM INSP. | PROJECT C226

SUBJECT ..... | HEC - 1

11	417.	4105.	3851.
12	457.	4889.	4966.
13	476.	5456.	5495.
14	485.	5762.	5813.
15	483.	5777.	5770.
16	473.	5477.	5426.
17	455.	4944.	4908.
18	434.	4355.	4314.
19	414.	3809.	3785.
20	392.	3313.	3374.
21	368.	2865.	2932.
22	345.	2465.	2558.
23	322.	2113.	2223.
24	300.	1808.	1938.
25	275.	1547.	1749.
26	248.	1324.	1543.
27	223.	1133.	1348.
28	199.	969.	1167.
29	177.	829.	1006.
30	159.	710.	865.
31	142.	607.	754.
32	127.	520.	653.
33	113.	445.	564.
34	101.	381.	485.
35	91.	326.	417.
36	82.	279.	358.
37	74.	238.	306.
38	67.	204.	276.
39	60.	175.	247.
40	53.	149.	218.
41	47.	128.	192.
42	41.	109.	168.
43	36.	93.	146.
44	31.	79.	127.
45	26.	61.	108.
46	21.	32.	86.
47	16.	11.	64.
48	12.	7.	48.
49	9.	5.	35.
50	6.	3.	26.
51	5.	2.	19.
52	3.	1.	14.
53	2.	0.	10.
54	2.	0.	7.
55	1.	0.	5.
56	1.	0.	3.
57	1.	0.	2.
58	0.	0.	2.
59	0.	0.	1.
60	0.	0.	1.
61	0.	0.	1.
62	0.	0.	0.
63	0.	0.	0.
64	0.	0.	0.
65	0.	0.	0.
66	0.	0.	0.
67	0.	0.	0.
68	0.	0.	0.
69	0.	0.	0.
70	0.	0.	0.
71	0.	0.	0.

133	0.	0.	0.	
134	0.	0.	0.	
135	0.	0.	0.	
136	0.	0.	0.	
137	0.	0.	0.	
138	0.	0.	0.	
139	0.	0.	0.	
140	0.	0.	0.	
141	0.	0.	0.	
142	0.	0.	0.	
143	0.	0.	0.	
144	0.	0.	0.	
145	0.	0.	0.	
146	0.	0.	0.	
147	0.	0.	0.	
148	0.	0.	0.	
149	0.	0.	0.	
150	0.	0.	0.	
SUM			75451.	

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5813.	5396.	2937.	1048.	75451.
INCHES		2.18	4.75	5.09	5.09
AC-FT		2677.	5828.	6239.	6239.

RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	3	5847.	5392.	2975.	1048.	23.00
ROUTED TO	33	5813.	5396.	2937.	1048.	23.00

REPORT ON

OPERATION OF THE

SEELEY DAM

SPILLWAY AND DRAINPIPE

Prepared by:

Dr. Terry W. Sturm
University of Notre Dame
Notre Dame, Indiana
April 20, 1976

INTRODUCTION

A preliminary analysis of the operation of the spillway of the Seeley Lake Dam on the Cohansey River in Cumberland County, New Jersey is presented herein. The following aspects of the flooding problem upstream of the dam are considered: 1) the effect of the 4-foot diameter drainpipe on reservoir levels during the passage of a flood, and 2) the influence of the Seeley Bridge opening on the operation of the Seeley Lake spillway, which is immediately upstream of the bridge.

DRAINPIPE OPERATION

The 4-foot diameter drainpipe in the Seeley Dam has a discharge capacity which is relatively small in comparison to the maximum spillway capacity. Furthermore, the effect of operating the drainpipe during passage of a flood is practically negligible in regard to the maximum lake level. As a flood of reference, the July, 1975 flood on the Cohansey River is considered. An interview with a homeowner living on Lake Seeley established an estimate of the maximum lake level during this flood of 3 ft above the crest of the spillway. At this lake level, the discharge of water over the spillway is estimated at 1625. cubic feet per second compared with a discharge through the drainpipe of 230 cubic feet per second if fully open. The discharge estimate for the drainpipe is based on

a visual observance of the maximum tailwater level on the apron of the spillway during the reference flood.[1]

The effect of the drainpipe on the maximum level of Seeley Lake during a flood seems to be the question of interest rather than the magnitude of the drainpipe discharge. A dam serves to store flood waters temporarily and then release them at a lower rate and over a longer period of time than would have occurred without the dam. The available storage in Seeley Lake, however, is relatively small compared to the volume of floodwater during a large flood such as occurred in July, 1975. The reduction in peak outflow from the dam due to storage is thus fairly small whether the drainpipe is operated or not. The net result is that the operation of the drainpipe would not significantly change the level to which the lake rises during a flood.

An approximate calculation shows that a spillway outflow of 1625 cubic feet per second corresponds to a peak inflow to the lake of approximately 1710 cubic feet per second for a storm producing runoff over a 24-hour period. If the pipe spillway had been operating for this same storm event, the lake level would have risen to 2.7 ft above the spillway crest rather than 3. ft., which is a difference of approximately 3½ inches.[2]

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[1]The discharge coefficient for the spillway is 3.40 and the spillway length is 92. ft. The drainpipe coefficient is 0.82 and maximum tailwater was at elevation 45.25 with the spillway crest elevation taken at 50.0 ft.

[2]This calculation is based on assuming triangular-shaped hydrographs and a linear head-storage relation with a lake surface area of 28 acres.

EFFECT OF BRIDGE CONSTRICTION

A width constriction (e.g. an abrupt decrease in channel width) in open channel flow can cause a critical section upstream of which an increase in depth of flow occurs to "force" the flow through the constriction. This is sometimes referred to as a condition of "choked flow". In the case of a spillway upstream of a critical section, the increase in depth due to choking can cause submergence of the spillway and a decrease in flow over the spillway.

The possibility of choking and spillway submergence was investigated for Seeley Dam Spillway. The channel width downstream of the spillway decreases from 70 ft to 40 ft as shown in Figure 1. It was determined that the critical condition and choking do in fact occur at the bridge opening for a lake level of at least 4 ft above the spillway crest.[3] In this case, the depth just downstream of the spillway is 7.1 ft as a result of a submerged hydraulic jump as shown in Figure 1.[4] This depth is insufficient for submergence of the spillway since the crest is at elevation 50. and the apron at elevation 40. ft. At a lake level of 4.7 ft above the spillway crest, the spillway will still not quite be submerged due to choking by the bridge, but the lower east dike and roadway will begin to overtop. Therefore, it does not appear that the bridge itself can cause spillway submergence.

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[3] Henderson, Open Channel Flow (New York: Macmillan, 1966), p. 248.

[4] This depth is determined from energy conservation between the critical section and the section just after the jump.

It is quite possible, however, that insufficient channel capacity downstream of the bridge could lead to submergence of the spillway, particularly since there is a tributary inflow from Hand's Pond not far downstream of the bridge. This possibility was not investigated in the present report.

CONCLUSIONS

On the basis of preliminary calculations, it is concluded that the drainpipe for Seeley Dam has a practically negligible effect in reducing lake flood levels. The drainpipe should be used only for its intended purpose of dewatering the lake for reasons such as repair of the dam if necessary.

The Seeley Bridge does not appear to cause submergence of the Seeley Dam Spillway, although it does create a choked flow condition for lake levels of 4 feet above the spillway crest or more.